

Indicators of Environmental Health



*State of Hawaii
Department of Health
Environmental Health Administration
May 2009*

[www. hawaii.gov/health/environmental](http://www.hawaii.gov/health/environmental)

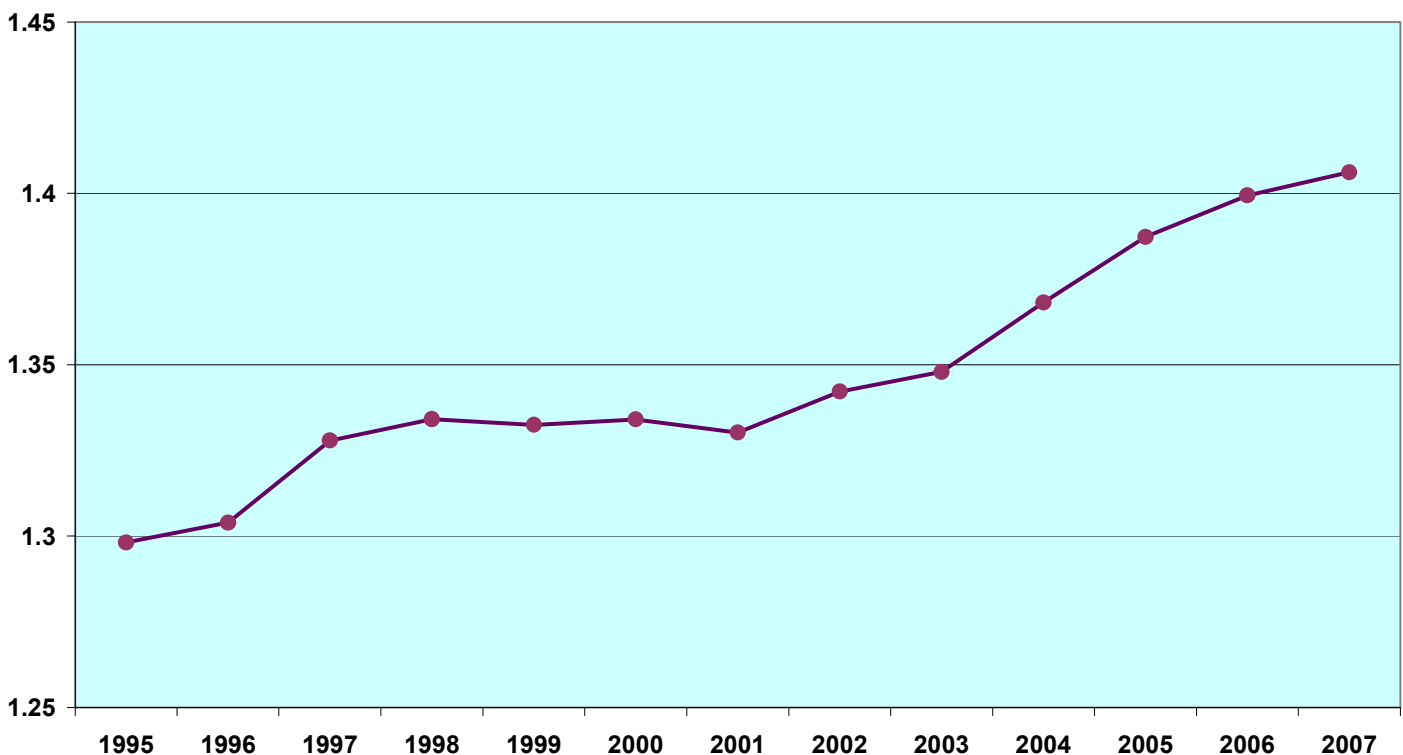
Introduction

Hawaii's de facto population* grew from about 1.26 million in 1993 to over 1.41 million in 2007, and is projected to grow to 1.72 million by 2020. The rise in population not only means a greater pressure on the natural resources, but also an increase in the amount of waste products generated that are released into the air, water and land. Recently the trend has shown more growth to the neighbor islands, which means the rural areas are now also facing some of the stresses of human impact.

Since we live on isolated islands in the middle of the sea, this means that we need to be very aware of the situations that are, or can be, created by polluting our limited land space. The effects of environmental health are closely tied to the public health of our residents and visitors. As the population continues to increase, so will the challenges to balance the needs of health, environment, and economics of Hawaii.

** "De facto" is defined as the number of persons physically present in an area, regardless of military status or usual place of residence.; it includes visitors present but excludes residents temporarily absent.*

State of Hawaii De Facto Population 1995-2007 (in millions)



Note: the vertical axis does not begin with zero

Source: State of Hawaii, Department of Business, Economic Development and Tourism (DBEDT)

For more information:

Hawaii Department of Business Economic Development and Tourism www.hawaii.gov/dbedt

The Hawaii Clean Energy Initiative www.hawaii.gov/dbedt/info/energy/hcei/

The Greenhouse Gas Emissions Reduction Task Force www.hawaii.gov/dbedt/info/energy/greenhouse/

Lead by Example Initiative: www.hawaii.gov/dbedt/info/energy/efficiency/state/lbe/

Document Notes

Environmental Indicator: a tool that uses the best available data to measure the quality of the environment and/or progress made in protecting the environment.

This report includes a selection of twenty environmental indicators, each occupying a single page. Each indicator shows a data set, a chart based on those data, and a discussion of the indicator and the data upon which it is based. Only data collected by, through or about the Hawaii State Department of Health programs are included.

The discussion accompanying each indicator is separated into five sections:

Explanation: the first section explains the data and chart, focusing on the fundamental picture portrayed the chart. Terms and caveats are also discussed in this section.

Implications: An “implications” section follows, with a short and sometimes subjective discussion of what impact the indicator findings may have on public health and the environment, and therefore on the Department of Health’s (DOH) environmental programs.

Data Quality: The third section provides a one-word assessment of date quality for the indicator. Data quality is ranked as either High (\pm 5-10% confidence), Medium (\pm 10-25% confidence) or Low (\pm 25-50% confidence).

The last two discussion sections note the source of the data and comment on whether the data are required of DOH by the U.S. Environmental Protection Agency (EPA). In most cases, when a percentage scale is used in a chart, the scale ranges from 0 to 100 percent. To more clearly show trends, some chart scales extend from values of 50% or 75% to 100%.

Data used are organized on a federal fiscal year (FFY) calendar, October through September, unless otherwise noted, and usually cover the years 2003-2008, in order to show a five-year trend for each indicator. Some indicators do not have data available for that period, and some provide only a “snap shot” of information for a single year.

CAB	-Clean Air Branch
CWB	-Clean Water Branch
DOH	-Department of Health
EHA	-Environmental Health Administration
EPA	-U. S. Environmental Protection Agency
EPO	-Environmental Planning Office
HEER	-Hazardous Evaluation and Emergency Response Office
IRHB	-Indoor and Radiological Health Branch
SDWB	-Safe Drinking Water Branch
SHWB	-Solid & Hazardous Waste Branch
SLD	-State Laboratories Division
VCB	-Vector Control Branch
WWB	-Wastewater Branch

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Ambient Levels of Sulfur Dioxide Compared to National Standards

Explanation: The national standard for sulfur dioxide (SO₂) concentrations was set by EPA at 0.03 parts per million (ppm) as the annual average limit of SO₂ in ambient air. The Honolulu air monitoring station is located atop the DOH building downtown. Data from this station are shown here as representative of SO₂ concentrations in Hawai'i. The results show that the annual average over the past five years, 0.000-0.001 ppm, has been well below the standard.

Implications:

Hawaii's annual average SO₂ concentrations are very low compared to the national standard. On persistent Kona wind days, volcanic emissions from the island of Hawaii can be transported to Oahu, and are experienced mostly as particulates. Beginning in March 2008, the opening of the new vent in the Halemaumau crater and the continuation of the Puu 'O'o vent have contributed to elevated levels of SO₂ on the Big Island. While this natural exceptional event is not a representative indicator of air quality across the state, areas on the Big Island may be exposed to varying levels of SO₂ depending on the location and the local wind conditions. An SO₂ advisory website, the Hawaii Short Term SO₂ Alert Index, is available at www.hiso2index.info.

For more information: www.hawaii.gov/health/environmental/air/cab/index.html. Within this website, to see a listing of elevated air pollution levels, click on "Public Notification: Air Pollutant Exceedence on Big Island (pdf)." To view near real time monitoring data, click on: "Online Air Quality Data."

Sulfur Dioxide Data

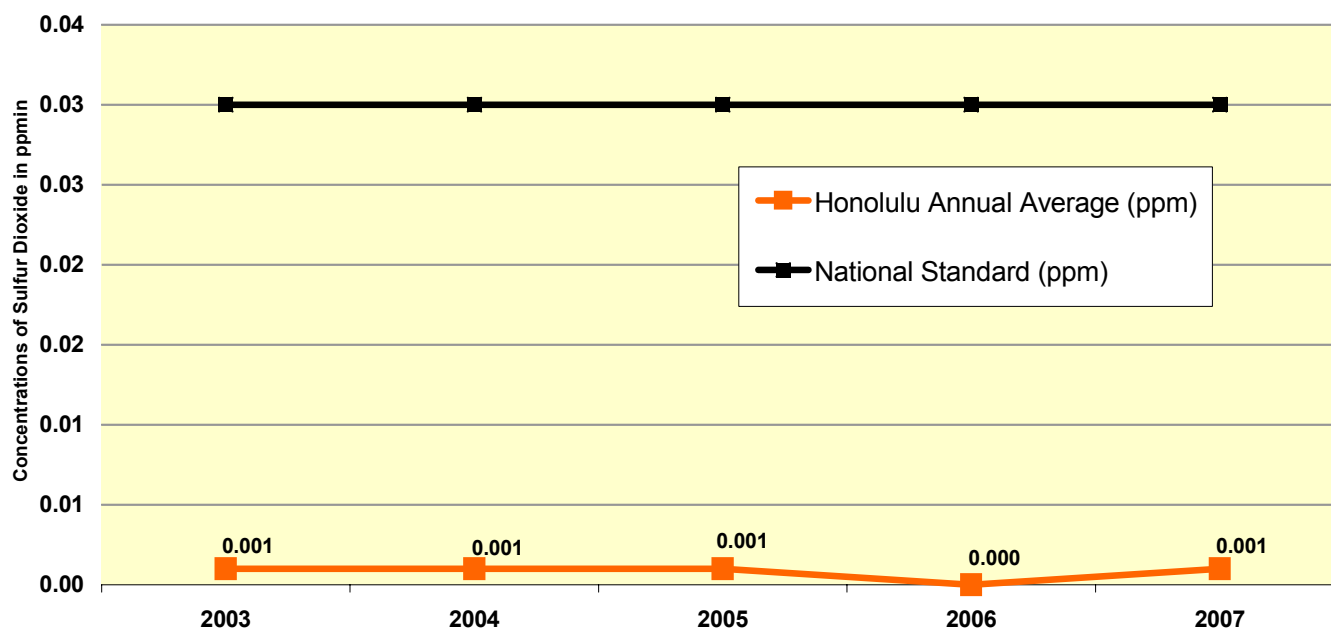
FFY	Honolulu Annual Average of SO ₂	National Standard for SO ₂
2003	0.001	0.03
2004	0.001	0.03
2005	0.001	0.03
2006	0.000	0.03
2007	0.001	0.03

Data Quality: High (± 5-10% confidence).

Source: DOH Clean Air Branch.

Data are required by the EPA

Hawai'i's Annual Average Sulfur Dioxide Levels
(Honolulu Station) Compared to the National Standard



Ambient Levels of Air-borne Particulates Compared to National Standards

Explanation: The EPA has set the annual average of the particulate matter, or PM_{2.5}, at 15 micrograms/cubic meter (µg/m³). PM_{2.5} is defined as particulates with an aerodynamic diameter less than or equal to 2.5 microns. At the Honolulu monitoring station, located in the heart of downtown, the annual average concentration of particulates varied from 3.0 to 4.0 µg/m³. At 4.0 µg/m³ this annual average is well below EPA's standard.

Implications:

The concentrations measured in Honolulu are far below the national standard. On persistent Kona wind days, volcanic emissions from the island of Hawaii can be transported to Oahu, and are experienced mostly as particulates. Beginning in March 2008, the opening of the new vent in the Halemaumau crater and the continuation of the Puu `O`o vent have contributed to elevated levels of PM_{2.5} on the Big Island. While this natural exceptional event is not a representative indicator of air quality across the state, areas on the Big Island may be exposed to varying levels of PM_{2.5} depending on the location and the local wind conditions. A PM_{2.5} advisory website, AIRnow, is available at : www.airnow.gov/index.cfm?action=airnow.fcsummary&stateid=15.

For more information: www.hawaii.gov/health/environmental/air/cab/index.html. Within this website, to see a listing of elevated air pollution levels, click on "Public Notification: Air Pollutant Exceedence on Big Island (pdf)." To view near real time monitoring data, click on: "Online Air Quality Data."

Air-borne Particulates Data

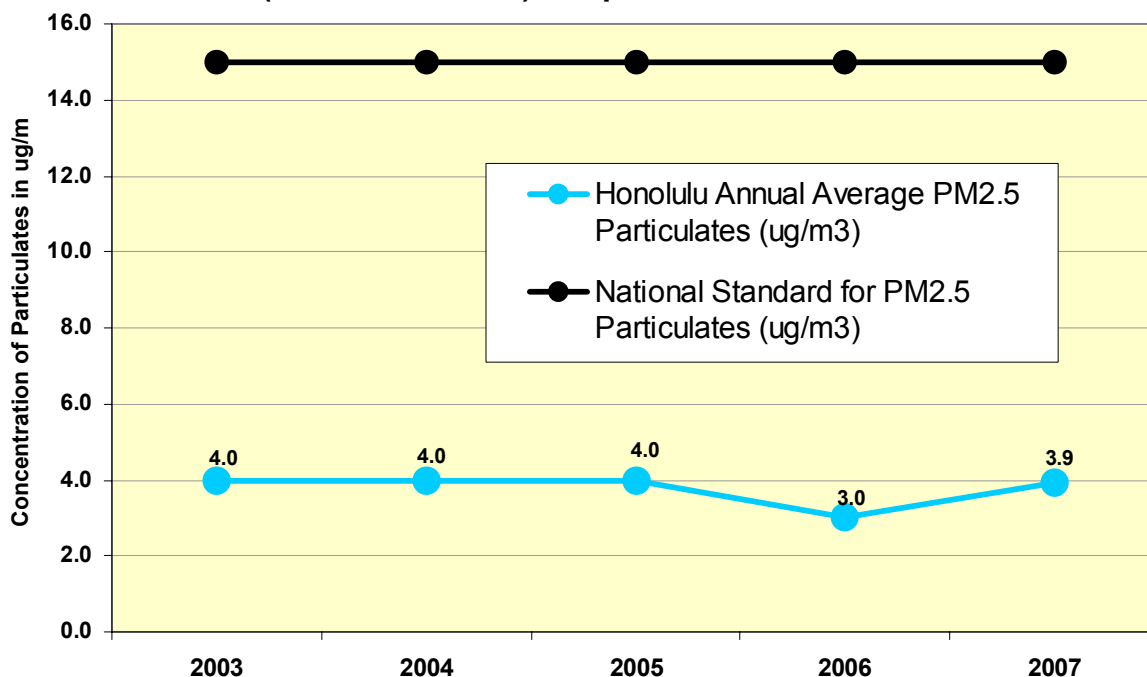
FFY	Honolulu Annual Average of PM _{2.5}	National Standard for PM _{2.5}
2003	4.0	15
2004	4.0	15
2005	4.0	15
2006	3.0	15
2007	3.9	15

Data Quality: High (± 5-10% confidence).

Source: DOH Clean Air Branch

Data are required by the EPA.

Hawaii's Annual Average Particulate Level (Honolulu Station) Compared to the National Standard



Ambient Levels of Carbon Monoxide Compared to National Standards

Explanation: EPA set the 1-hour average limit for carbon monoxide (CO) concentrations in ambient air at 35 parts per million (ppm). This indicator reflects CO data measured at the Honolulu monitoring station located in the heart of downtown, an area with heavy automobile traffic. The CO measurement differs from the other indicators in this report as it reflects the highest 1-hour value each year rather than an annual average. In addition to the 1-hour national standard, EPA has set an 8-hour standard for CO at 9 ppm.

Implications: Although there are some fluctuations in the annual averages, Hawai'i's recorded 8-hour values are consistently well below the national standard.

For real/near time monitoring data for Oahu and Hawaii: www.hawaii.gov/doh/air-quality/index.html

Data Quality: High (± 5 -10% confidence).

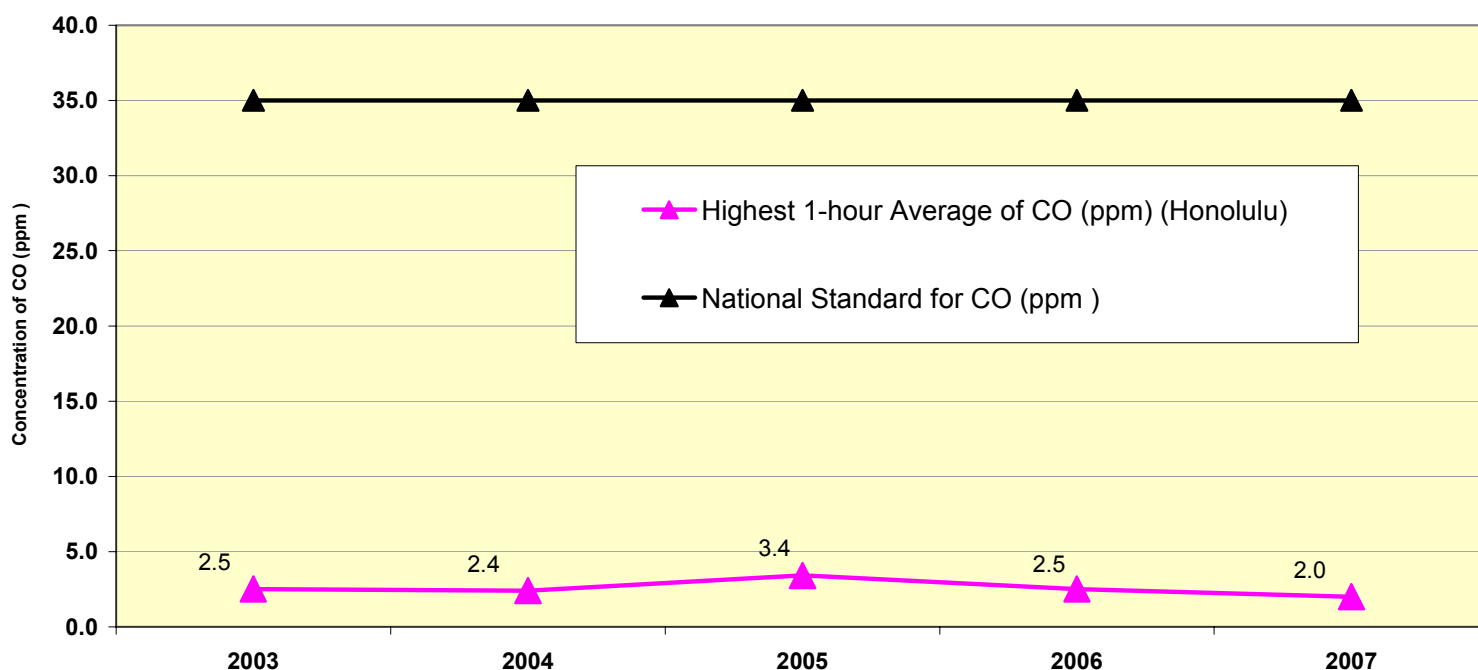
Source: DOH Clean Air Branch

Data are required by the EPA.

Carbon Monoxide Data

FFY	Highest 1-hour Average of CO (Honolulu)	National Standard for CO (ppm)
2003	2.5	35
2004	2.4	35
2005	3.4	35
2006	2.5	35
2007	2.0	35

Hawai'i's Highest 1-hour Average for Carbon Monoxide (Honolulu Station) Compared to the National Standard



Percentage of Schools in Compliance with Required Asbestos Management Plan

Explanation: Buildings constructed before 1980 may contain asbestos in many materials including flooring, pipe insulation, structural fireproofing, mechanical areas, ceiling materials, and wall plaster. If asbestos-containing building materials (ACBMs) are not properly identified and managed they may be unintentionally disturbed, causing the release of asbestos fibers. ACBMs still exist in Hawai'i's schools. EPA regulations and Hawaii Administrative Rules require each school to prepare an Asbestos Management Plan, which documents the presence and condition of ACBMs and specifies provisions for properly managing any ACBM present. Plans are required to contain inspection and re-inspection reports; periodic surveillance reports; response action information; notices sent to parents and employees; designated person information and custodian training documents. Since the program's inception in 1988, over 400 schools have been inspected by the Indoor and Radiological Health branch. Compliance monitoring is ongoing. For the purposes of this measurement, compliance with the requirements of an approved plan is assumed unless an inspection proves otherwise. The number of schools required to comply will change as new schools open and existing schools are closed. DOH conducts compliance inspections at about 35 schools/year.

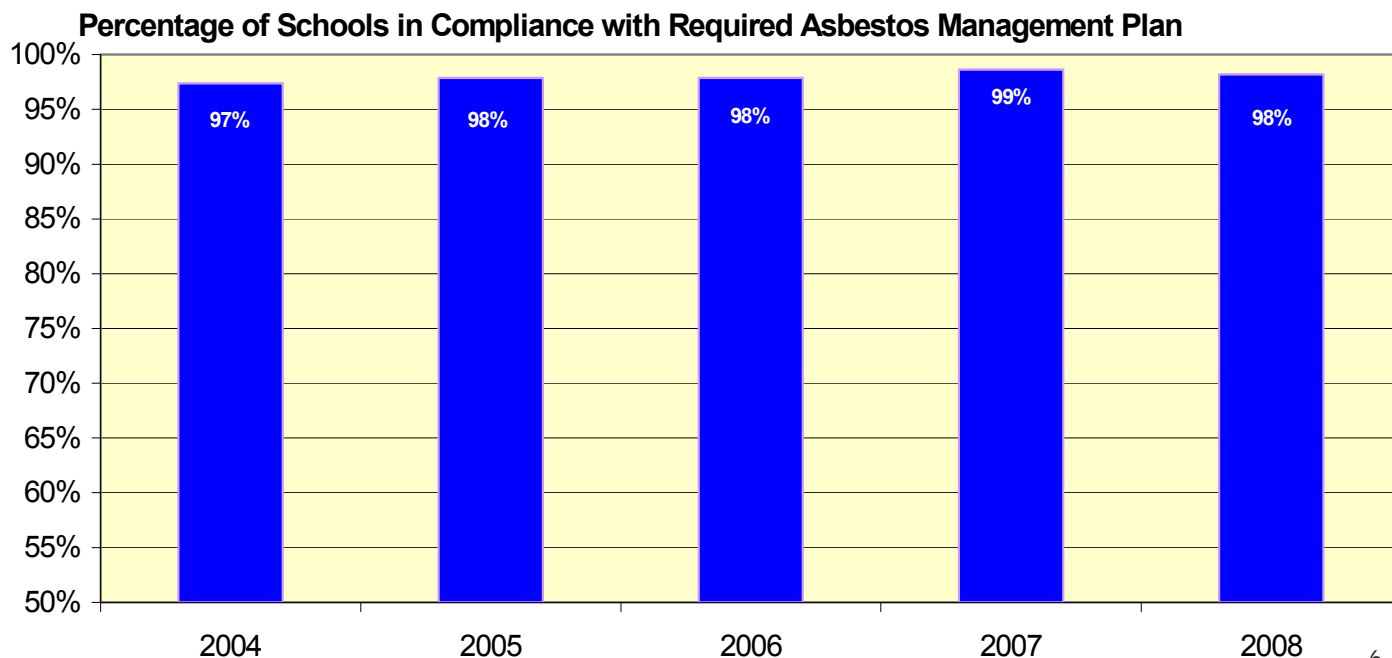
Implications: The chart shows an increase in compliance since 2004, likely the result of increased inspections along with greater follow-up activities. Almost all schools in Hawaii have an asbestos management plan, but there is not necessarily a direct correlation between the existence of a plan and its proper implementation. The improvement in compliance since 2004 has resulted from increases in both the implementation of the plans as well as the additional compliance assistance activities such as conferences with local education agencies, semiannual newsletters and reminders provided by the program. The total number of schools required to comply increased due to the addition of private and charter schools to the system across the state.

Data Quality: High (± 5 -10% confidence).

Source: Tom Lileikis (IRHB)

Data are required by the EPA

FFY	Total Number of Schools Required to Comply	Number of Schools in Compliance	Percentage of Schools in Compliance with Required Plan
2004	416	405	97%
2005	423	414	98%
2006	423	414	98%
2007	437	431	99%
2008	440	432	98%



Contaminated Sites with Clean-up Completed

Explanation: Progress made in the clean-up of contaminated sites, broken down into three categories, is measured by the date of completion of the clean-up process. The vast bulk of the clean-ups are comprised of leaking underground storage tank (LUST) sites. The next three indicators on the following pages will provide more specific data relating to the progress of each site category.

Implications: Staff has brought a backlog of LUST release cases into compliance with Hawai'i's UST rules.

Data Quality: High (\pm 5-10% confidence).

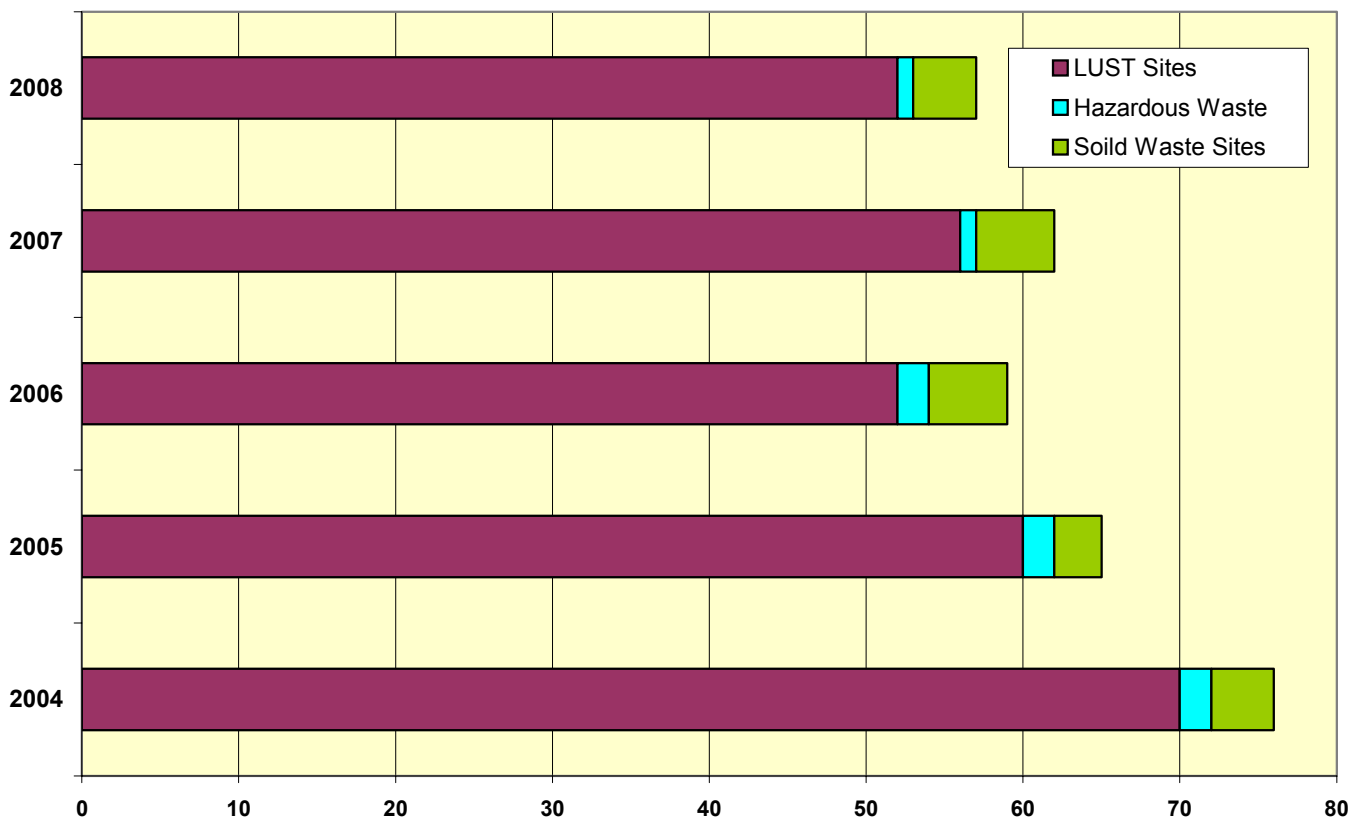
Sources: Grace Simmons (SHWB), Lane Otsu (SHWB), and Roxanne Kwan (SHWB).

Data are required by the EPA.

Contaminated Sites Clean-up Data

FFY	Hazardous Waste	Soild Waste Sites	LUST Sites	Total Sites
2004	2	4	70	76
2005	2	3	60	65
2006	2	5	52	59
2007	1	5	56	62
2008	1	4	52	57

Number of Contaminated Sites Cleaned-up



Cumulative Numbers of Leaking Underground Storage Tank Sites with Clean-up Completed or Partially Addressed

Explanation: Of the 1,955 confirmed releases from underground storage tanks from 1987 to 2008, 87% have had 'clean-up' completed. Nine percent of the sites have had 'clean up' partially addressed, (i.e., efforts have begun which: manage contaminated soil, remove free product, manage dissolved petroleum, and/or monitor the groundwater or soil), and 4% have yet to be addressed.

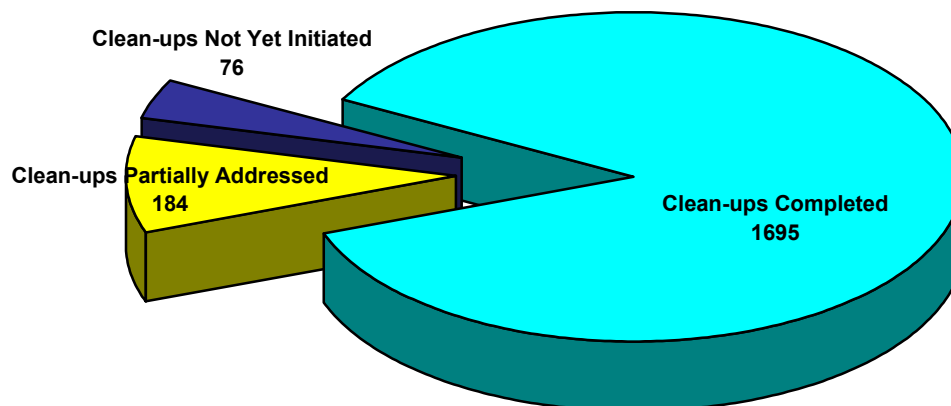
Implications: Some of the data for this indicator are included with data listed on the previous page; the data on this page pertains only to LUST sites and includes releases that have received no clean-up activity or that have only had clean-up partially addressed. Clean-ups for this category of contaminated sites has increased. Of the 4% of the sites that have not been addressed, some are recent releases for which the DOH has yet to receive information on clean-up efforts. None of the unaddressed sites constitutes an emergency situation.

Data quality: High (\pm 5-10% confidence).

Source: Roxanne Kwan (SHWB).
Data are required by the EPA.

LUST Site Clean-up Data							
FFY	Total Tanks	Active Tanks	Closed Tanks	Confirmed Releases	Clean-ups Partially Addressed	Clean-ups Not Initiated	Cumulative Clean-ups Completed
2004	7,775	2,076	5,699	1,803	253	113	1,437
2005	7,803	2,041	5,762	1,840	236	100	1,504
2006	7,832	2,001	5,831	1,874	206	94	1,574
2007	7,916	1,895	6,021	1,909	192	86	1,631
2008	7,845	1,770	6,075	1,955	184	76	1,695

Status of Leaking Underground Storage Tank Sites Cleaned Up as of FY 2008



Quantity of Hazardous Waste Generated

Explanation: Hazardous waste generation, as presented in this indicator, is reported to EPA by “large quantity generators” biennially in odd years. Data from the last reporting cycle for 2007 is available on the EPA website (www.epa.gov). Overall, the quantity of waste generated, as shown in this indicator, has ranged from roughly 780 to 1500 tons annually during the period from 1999 to 2007. Hazardous wastes in wastewater have been excluded from the indicator because the data quality for wastewater volumes is particularly questionable, especially since volume was removed as an EPA reporting requirement in 1997*. The majority of hazardous wastes in Hawai‘i are sent to permitted commercial treatment storage disposal facilities on the mainland, while the recyclable solvents are processed in state. Hazardous waste is defined in 40 CFR 261.3 as waste having any of the four hazardous characteristics: ignitability, corrosivity, reactivity, or toxicity, or a waste specially listed as a substance to be regulated as a hazardous waste. Common examples include paint, battery acid, oil, lead, and waste bleaches.

Implications: Compared to other states, hazardous waste generation has been relatively low in Hawai‘i. During the eight-year period represented by this indicator, hazardous waste generation appears to be fairly consistent except for a decrease in 2001. The significant decrease in waste generation for 2001 is linked to the efforts of the waste minimization coordinator and a stronger inspection and enforcement presence. The increases in 2003 -2007 may be due to a one-time generation for clean-up of contaminated sites.

* However, the amount on the EPA website for 2001 does include 464,076 tons of wastewater generated by Tesoro Refinery. In previous reports, Tesoro’s wastewater generation was not included.

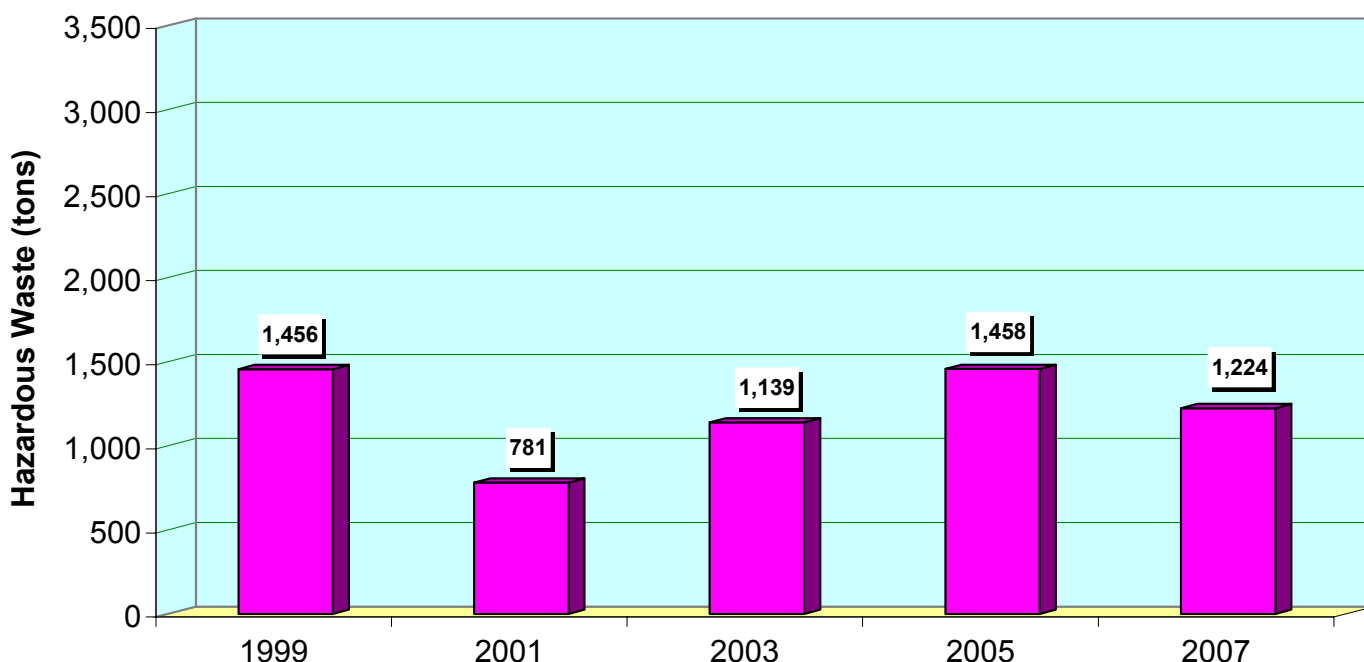
Data Quality: Low (± 25 -50%) confidence.

Source: Grace Simmons (SHWB).

Data are required by the EPA.

FFY	Hazardous Waste Generated in Tons
1999	1,456
2001	781
2003	1,139
2005	1,458
2007	1,224

Quantity of Hazardous Waste Generated in Hawaii



Solid Waste Recycled

Explanation: The amount of waste being landfilled has been increasing over the past seven to eight years. The percentage of solid waste diverted from landfills for recycling or reuse in Hawaii has also slowly increased over the past several years.

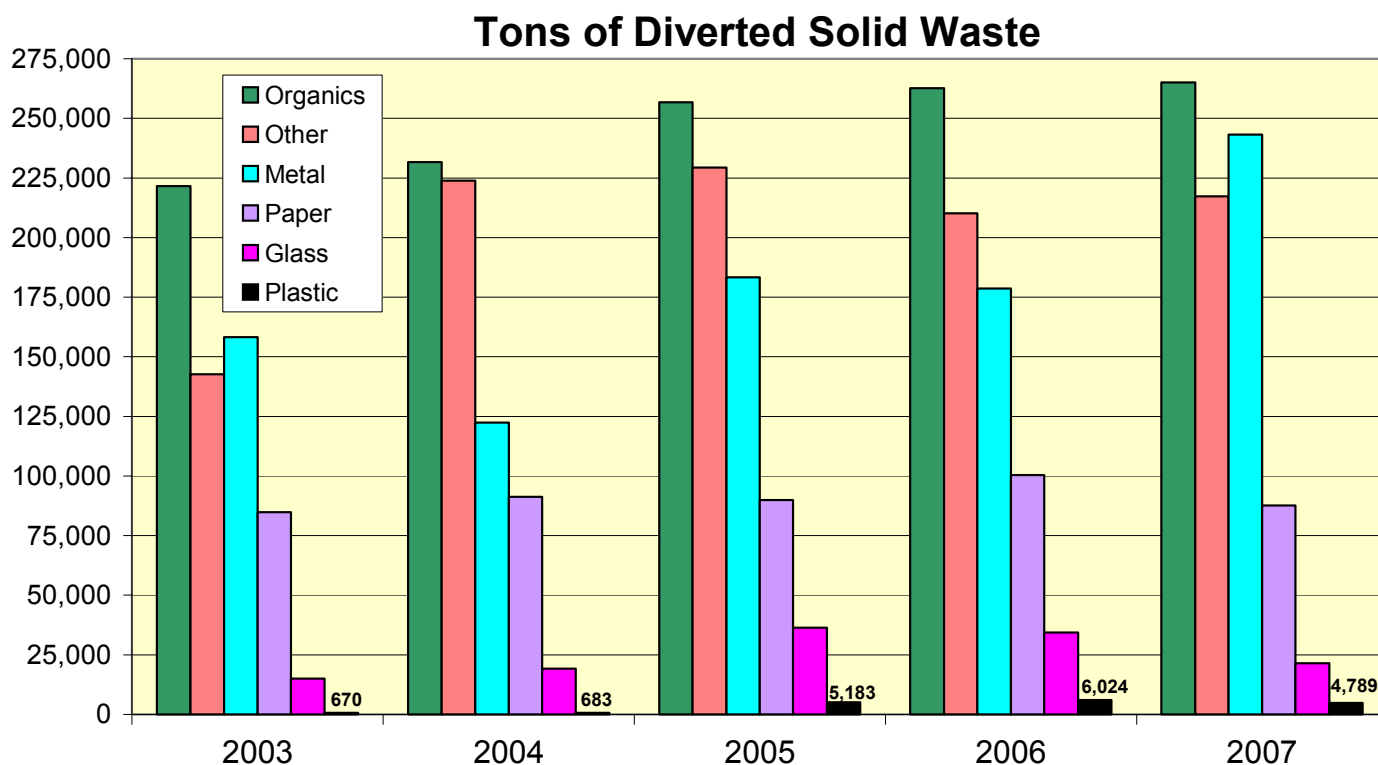
Implications: The State's current diversion rate is 32.3%, and is based mostly on the amount of recycling plus some reuse. The Environmental Protection Agency (EPA) data indicates a national recycling rate of 33.4% in 2007. The State's goal of 50% waste diversion was set in 1991 and mirrored the EPA's recycling goal at the time. The EPA has since revised its recycling goal to 35%. This change was made in recognition of the fact that states and municipalities needed a broader time frame in which to reach higher waste reduction levels.

Some mainland states and municipalities have taken great strides in increasing recycling rates, while Hawaii's commercial recyclers continue to deal with long-standing issues. Most notable is the high cost of shipping to the Far East or the mainland U.S. where most recycling markets are located. Volatility in recycled materials markets, combined with the relatively small amounts of materials generated in Hawaii, also continues to challenge recyclers.

Data Quality: 2003-2007: Medium
(± 10 -20%) confidence;
2001-2002: Low (± 25 -50%)
confidence

Source: Lane Otsu (SHWB)

Data are not required by the EPA.



Pounds of Solid Waste Generated Per Person

Explanation: On the average, each person in Hawaii generated over nine pounds of solid waste per day. The national average for 2007, as compiled by the Environmental Protection Agency, is 4.6 pounds per day*.

Implications: Hawaii faces many challenges with solid waste issues. Costs of shipping, program funding, and issues with commercial recyclers affect solid waste programs in Hawaii. However, with landfills becoming an issue on all islands, Hawaii needs to improve the awareness of the consequences of waste generation when dealing with limited landspace and related costs. The HI-5 beverage container recycling program continues to build support, and DOH has been active in promoting messages of “Reduce, Reuse and Recycle.” Laws require that each county develop and maintain an integrated solid waste management (ISWM) plan. The counties of Kauai, Maui and City and County of Honolulu, began the process of revising their existing ISWM plans during the 2006-2007 fiscal year.

*The methodology used by DOH is similar to EPA's, however there are many variables, and the data cannot be compared exactly. Both agencies include green waste and exclude construction and demolition waste.

Data Quality: Low ($\pm 25-50\%$) confidence

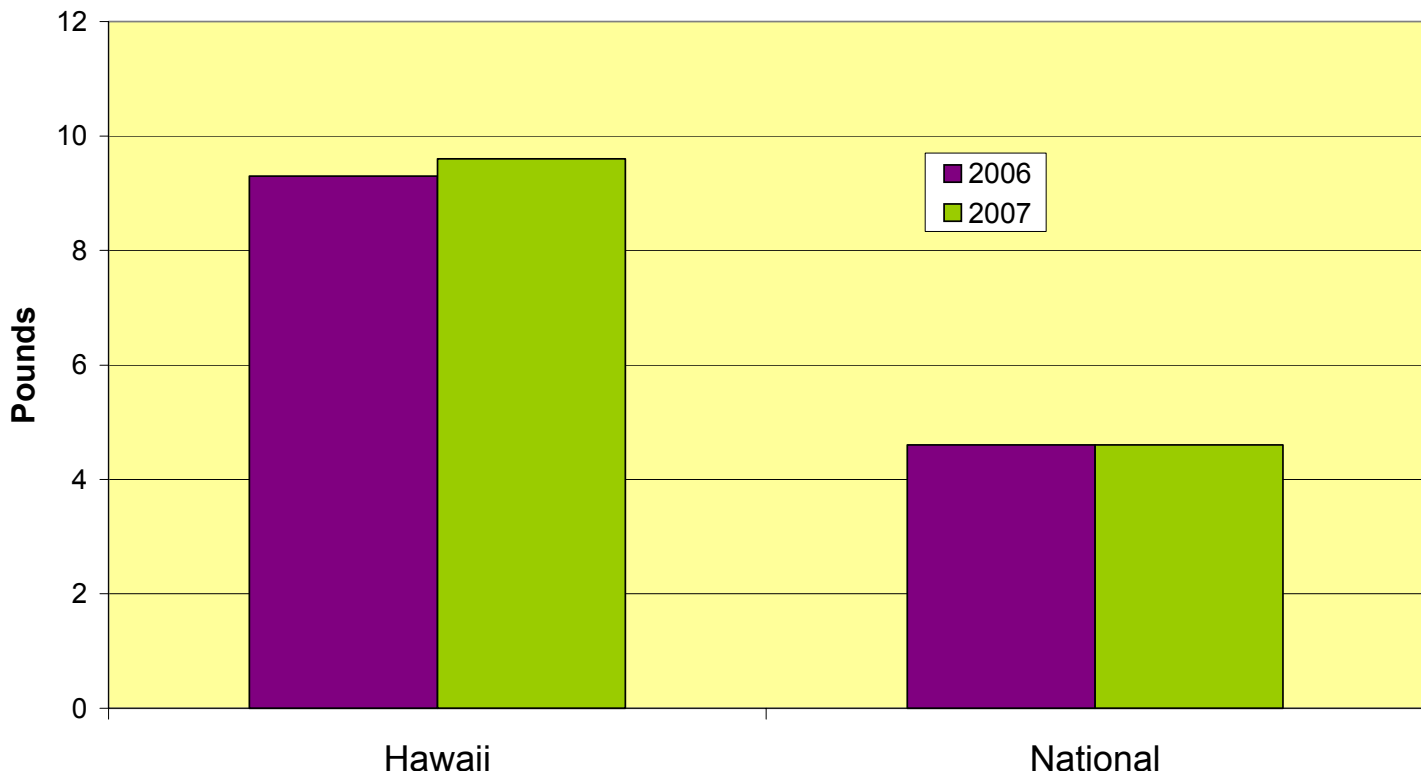
Source: Lane Otsu (SHWB)

Data are not required by the EPA.

Solid Waste Generated by Pounds/Person/Day

Calendar Year	Hawaii	National
2006	9.3	4.6
2007	9.6	4.6

Solid Waste Generated by Pounds/Person/Day



Laboratory Tests for Detection or Confirmation of Zoonotic Diseases

Explanation: The main focus for 2008 was preventing West Nile Virus (WNV) from reaching Hawaii. The Vector Control Branch and State Laboratories were at the center of the effort. Mosquitoes were trapped, counted and sorted by VCB Laboratory, then tested at State Laboratories Division for WNV. Dead birds were necropsied at VCB, then tested at SLD. Live bird testing was done by the US Dept of Agriculture. In addition to WNV, positive tests for leptospirosis were also a concern, though the numbers were less than the previous two years. Vector Control was also testing for plague and murine typhus. Though avian influenza was a major concern, the testing was done at the State Departments of Agriculture and Land & Natural Resources, and the Federal Department of Fish & Wildlife.

Implications: Though West Nile Virus did not reach Hawaii in 2008, the prevention efforts will continue to be sustained. WNV was the most high profile disease, however surveillance and testing must also be continued for other zoonotic diseases that cause threats to public health.

Summary of Zoonosis Laboratory Activities and Findings by Area for 2008

Disease Tested (# Positive)	TOTAL	Oahu	Hawaii	Maui	Kauai
West Nile (mosquito pools*)	5678 (0)	4824 (0)	560 (0)	92 (0)	202 (0)
West Nile (birds)	212(0)	110 (0)	41 (0)	48 (0)	13 (0)
Leptospirosis	497 (18)	94 (4)	400 (14)	3 (0)	0 (0)
Murine Typhus	417 (3)	118 (3)	295 (0)	4 (0)	0 (0)
Plague	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

* A group of 15-50 insects pooled together for testing purposes. The total number of mosquitoes tested for WNV was 245,431.

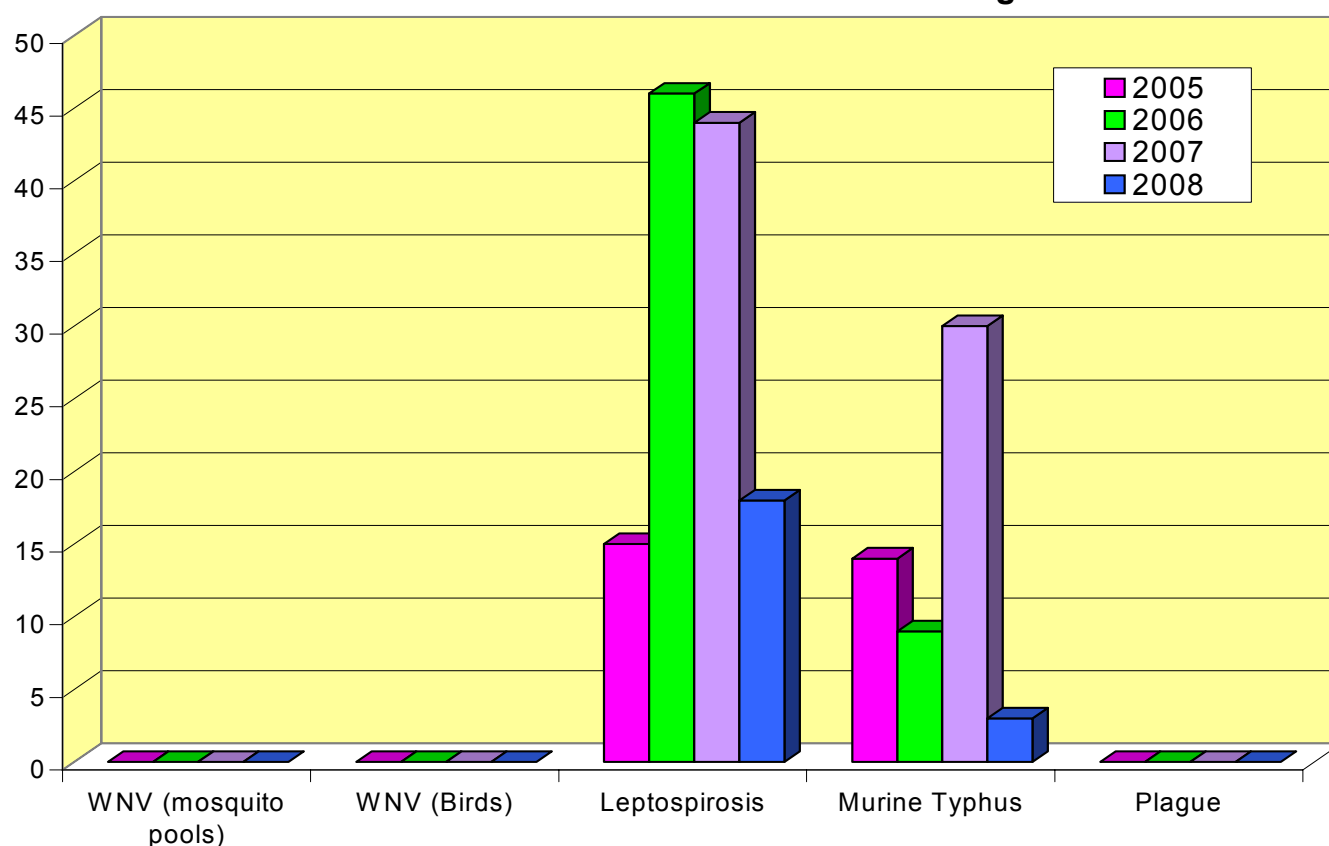
** Rat and mouse sera tested by the indirect fluorescent antibody (IFA) technique

*** Only animals retrieved from ports of entry tested for plague

Source: Wes Warashina (VCB Laboratory)

Data are not required by the EPA.

Number of Positive Zoonotic Disease Findings 2005-2008



Percentage of Population Served Drinking Water Meeting State and Federal Microbiological and Chemical Maximum Contaminant Levels

Explanation: Drinking water microbiological or chemical standards are called Maximum Contaminant Levels (MCLs). Water that exceeds MCLs is believed to be harmful to human health. In 2008, 99.6% of Hawaii's residents and visitors were served drinking water that met all of the MCLs on a monthly basis. Population figures are derived by summing the populations each public water system reports.

There were 55,859 persons in three water systems who were served water not in compliance with MCLs for one month of the reporting year. This equals a non-compliance rate of 0.3% over Hawaii's population of 1,416,384 people.

Implications: The number of people served water not in compliance is calculated as a monthly average this year instead of as an annual average, as done in prior years. Violations are given to a whole system (and thus the whole system population is counted) even though in actuality only a part of the system may have been exposed to water with a positive bacterial count. Also, for the purposes of this count, each system population was considered exposed to the microbiologically contaminated water for the whole month, although the population was actually exposed for only a part of the month. The compliance rate has consistently exceeded 99.0% over the last five years. Whenever a violation is found, the public is notified through electronic media, hand-delivered notices, or published notices.

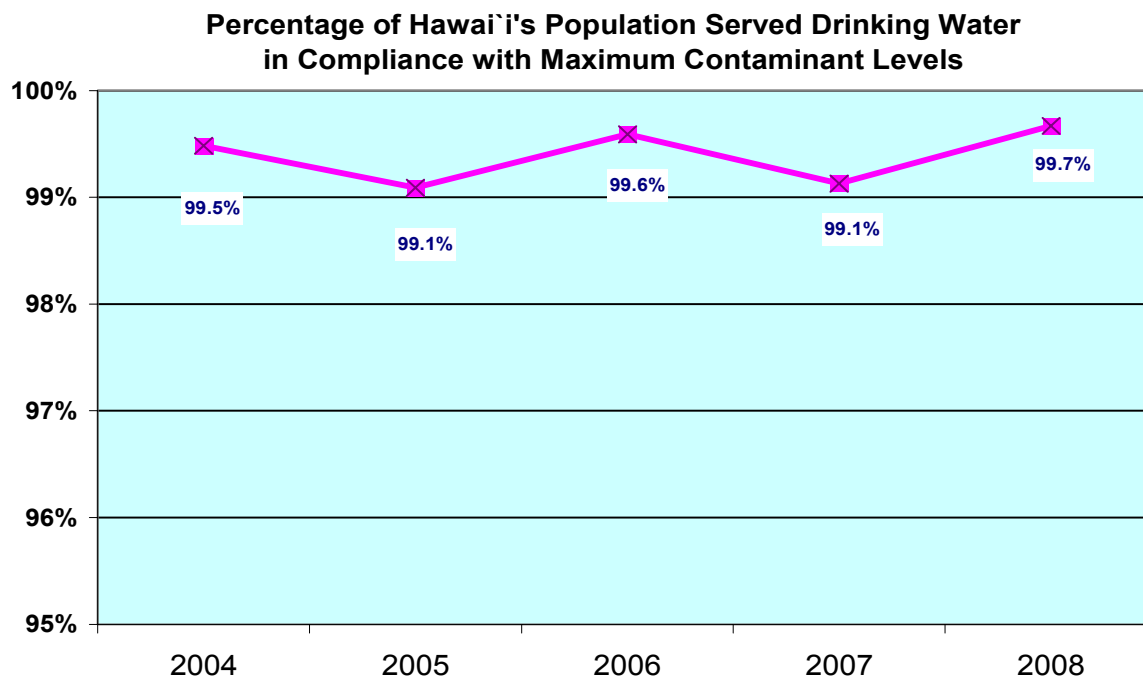
Drinking Water MCL Compliance Data

Data Quality:
High (\pm 5-10% confidence).

Source: Ann Zane (SDWB)

Data are required by the EPA

Calendar Year	Total Population Served Drinking Water	Population Served Water Below MCLs	Percentage Population Served Water in Compliance with MCLs
2004	1,341,572	1,334,645	99.5%
2005	1,341,727	1,329,510	99.1%
2006	1,341,430	1,335,929	99.6%
2007	1,341,430	1,329,748	99.1%
2008	1,416,384	1,411,729	99.7%



Cumulative Number of Sanitary Surveys Conducted for Drinking Water Systems 2007-2011

Explanation: A sanitary survey consists of a periodic review of the water source, facilities, equipment, operation and maintenance practices and records to verify that a public water system is operating properly. The DOH goal is to conduct “Sanitary Surveys” of all public water system source, treatment, and distribution operations in a five-year period. For Hawai‘i, that averages 26 surveys per year. The SDWB completed the last five-year cycle in 2006, and the next cycle will go from 2007-2011. Because of personnel shortages, implementing new rules and regulations, and dealing with issues regarding national security of drinking water systems, meeting these survey goals will continue to be a challenge.

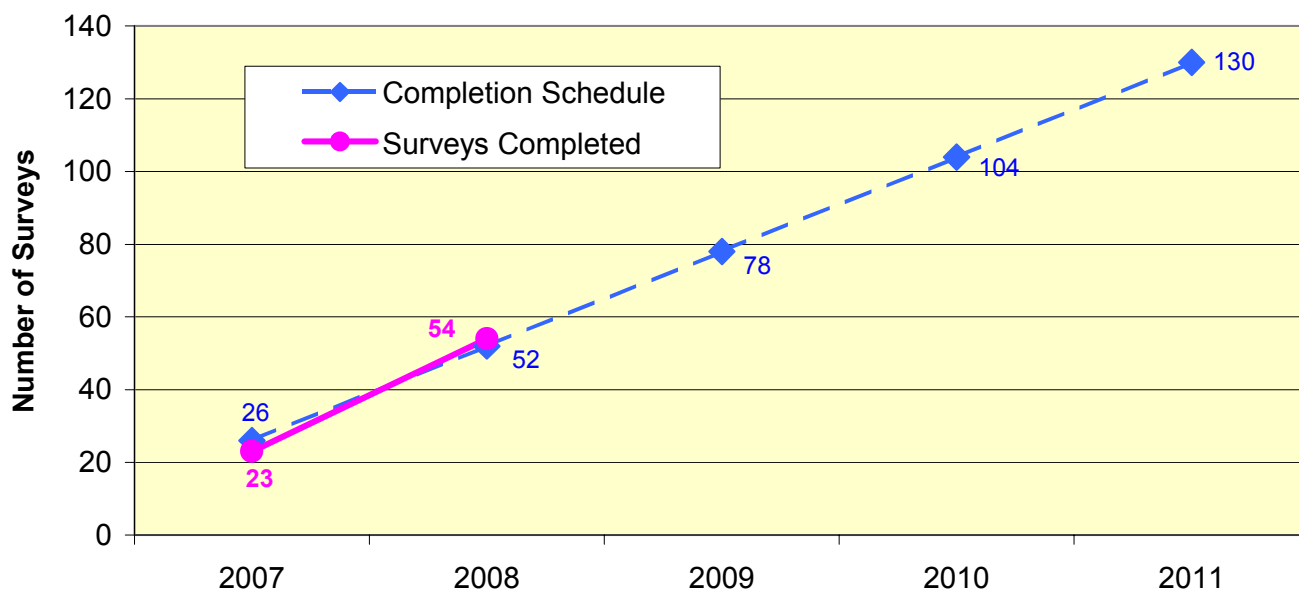
Implications: The first round of surveys was held from 1997 to 2001, so DOH is embarking on the third round of inspecting these water systems again. Within 30 days of each survey, the SDWB submits a sanitary survey report to the purveyor discussing any deficiencies and recommendations. The SDWB also requests a response from the purveyor within 30 days of receiving the report. When problems are found during surveys, the risk of water contamination is assessed. If the problem poses an imminent risk of contamination to the source or finished water, the SDWB will direct the purveyor to promptly correct the problem.

Data Quality:
High (\pm 5-10% confidence).

Source: SDWB

FFY	Total Cumulative Number of Systems to Survey	Surveys Completed Annually (& Cumulative)
2007	26	23 (23)
2008	52	31 (54)
2009	78	
2010	104	
2011	130	

Drinking Water Sanitary Surveys Completed Compared to EPA-Required Completion Schedule



Percentage of Injection Well Facilities with Current State Underground Injection Control (UIC) Permits

Explanation: The percentage of underground injection well facilities in compliance with state regulations (those with a current permit) for the calendar year 2008 has remained the same at approximately 52% since the year 2007. Most noncompliant injection well facilities were those for drainage injection wells – wells used for rainfall runoff disposal. The compliance percentage for drainage injection well facilities has remained the same at approximately 49%. Injection well facilities for sewage disposal and industrial-related wastewater disposal had a compliance that remained the same at approximately 59%. Permit renewals for sewage and industrial-related injection have processing priority over permit renewals for drainage injection. Heavy DOH workloads of large-capacity cesspool injection well permitting and abandonment applications continue to negatively affect the overall compliance percentages.

Implications: Drainage injection wells typically pose a lower potential for environmental contamination as compared to industrial or sewage related facilities. However, for counting purposes, all facilities are weighed equally. Injection well abandonment applications were given high processing priority due to the importance of achieving proper backfilling work and accommodating construction schedules.

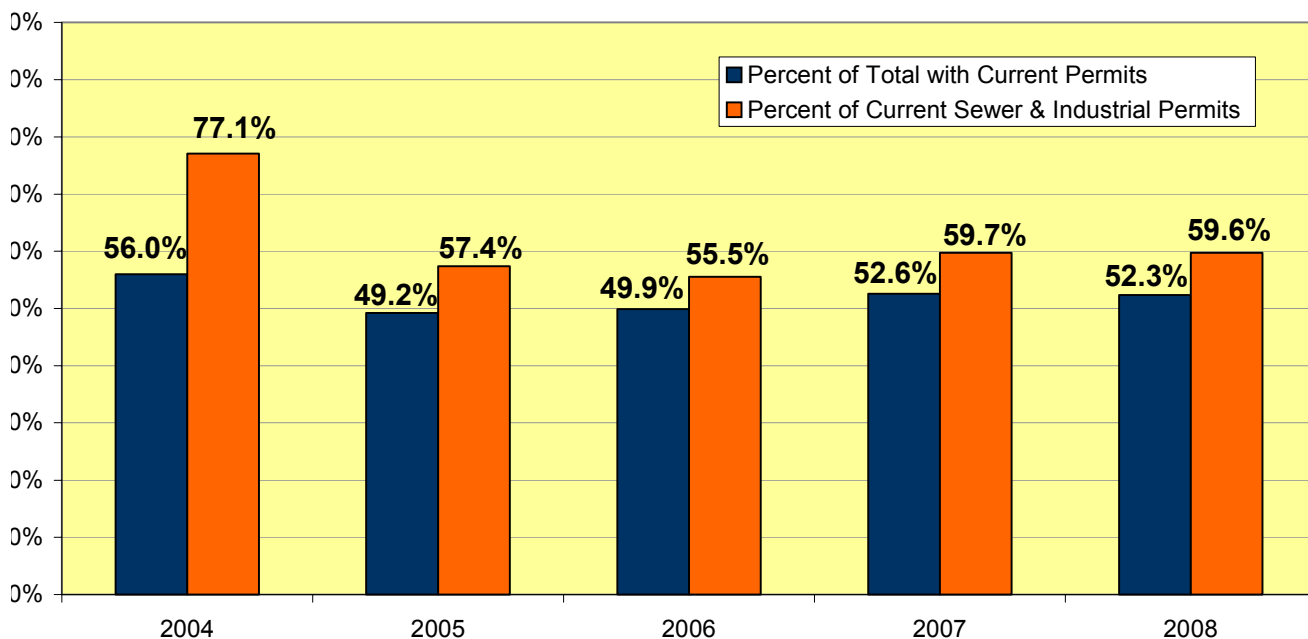
Data Quality: High ($\pm 10\%$ confidence).

Data are required by the EPA.

Source: Chauncey Hew (SDWB)

Calendar Year	Total UIC Permits	Total Expired Permits	Percent of Total with Current Permits	Percent of Current Sewer & Industrial Permits
2004	677	298	56.0%	77.1%
2005	679	345	49.2%	57.4%
2006	714	358	49.9%	55.5%
2007	768	364	52.6%	59.7%
2008	796	379	52.3%	59.6%

Percentage of Underground Injection Well Facilities with Current State Permits



Shoreline Postings Due to Sewage or Other Water Pollution

Explanation: Residents and visitors use our public beaches and the ocean for recreation and fishing. Sewage, chemical spills, and other releases can restrict our enjoyment and use of the shoreline as well as affect aquatic life. The following table shows the number of times shoreline waters were posted with warning signs (unsafe due to water pollution) by the counties, military, private parties or DOH. The reports starting from 2005 reflect a major change in that all shoreline recreational waters were considered. Although harbors are not considered recreational waters, they were included to be consistent with the 2005 annual report. Reports prior to 2005 only covered sandy beaches. Since 2005, the report also distinguishes days posted by different events: dry or wet weather sewage spills.

Implications: There were 147 days of shoreline postings in 2008. The rise in sewage posting days corresponds to heavy rainfalls. There were 22 spill incidents during 2008 that needed postings. For sewage spills, shorelines are first posted, then sampling occurs. The CWB reviews bacteria data prior to allowing removal of the signs.

Source: Clean Water Branch

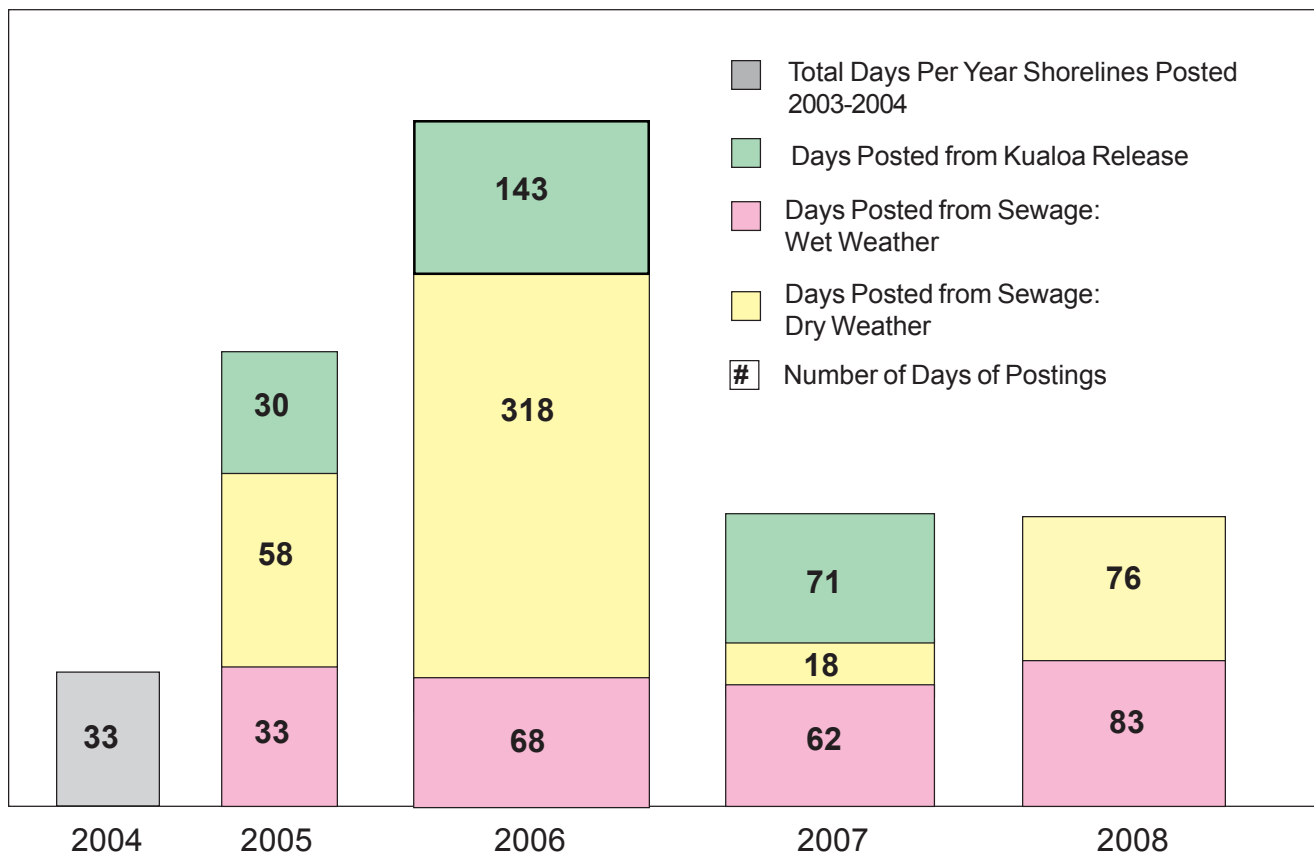
Data Quality:
Medium
(± 10-25%) confidence

Calendar Year	Total Days Per Year Shorelines Posted	Days Posted from Sewage Events
2004	33	N/A
2005	121	121
2006	429	429
2007	151	151
2008	159	159

Notes:

- i) These numbers do not reflect postings of warning signs on streams, lakes, and other inland waters, such as the Ala Wai Canal.
- ii) Other agencies may also post other shoreline warning signs. For example, the City and County of Honolulu posts warning signs on beaches after opening stream mouths to drain water. These are not included in this table.
- iii) This does not include "brown water advisories" which are general media releases anticipating or responding to heavy storm water runoff and are not accompanied by actual postings.

Shoreline Postings Due to Water Pollution*



*Schematic graph - not to scale

Percentage of Wastewater Recycled Annually

Explanation: Wastewater recycling (or reuse of water treated to a level appropriate for irrigation purposes) has stayed in the range of 23.5 to 24.6 million gallons per day (MGD) between 2004 and 2008. In 2008, there was a slight decrease in wastewater reuse because the Waikoloa Resort wastewater treatment plant, which produces approximately 0.5 MGD of R-2 water, stopped using their effluent for reuse. Waikoloa Resort constructed homes around the perimeter of the golf course that did not meet the 500' buffer distance for spray irrigation of R-2 water. Therefore, they ceased using the R-2 water from the plant for irrigation of their golf course.

Implications: DOH has plans to encourage reuse to about 30 MGD, or about 20%, by 2015. However, there are concerns that this goal may not be realized, in part due to lack of staff to work on the program.

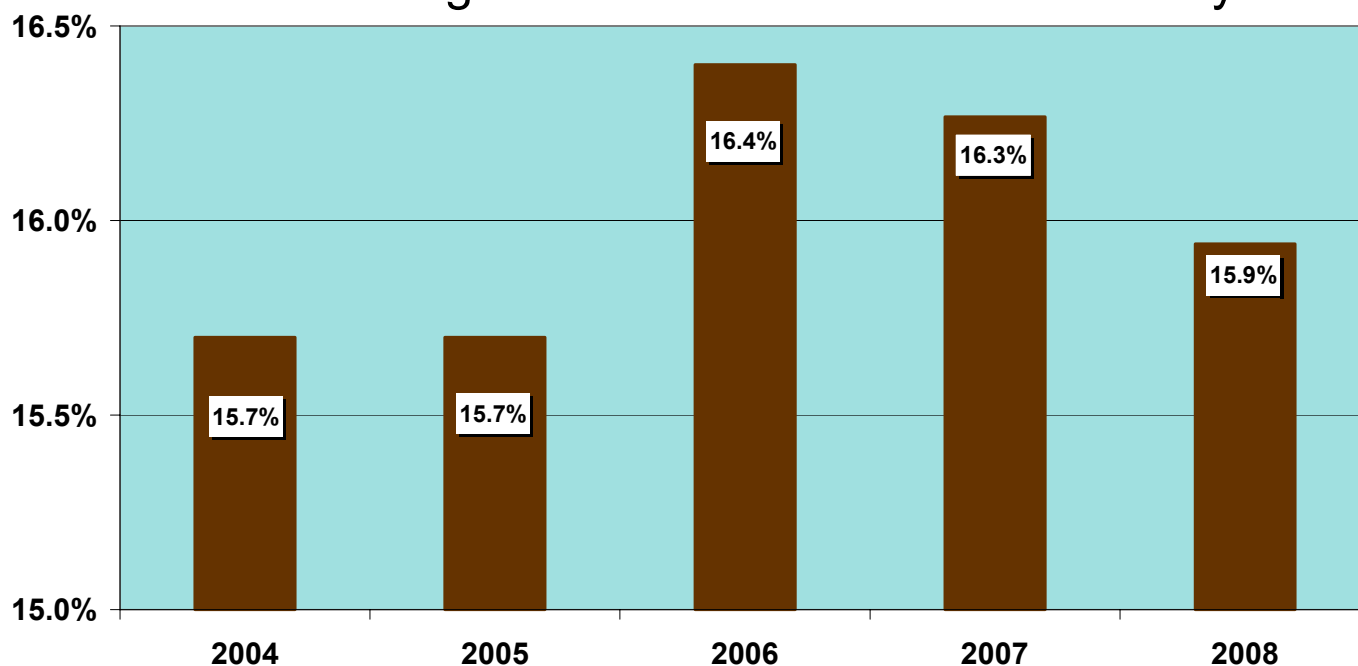
Data Quality: High (\pm 5-10%) confidence.

Source: Sina Pruder, Tomas See (WWB).

Data are not required by the EPA.

FFY	Total Wastewater Treated (MGD)	Wastewater Reused (MGD)	Percent Reused
2004	150.0	23.5	15.7%
2005	150.0	23.5	15.7%
2006	150.0	24.6	16.4%
2007	150.0	24.4	16.3%
2008	150.0	23.9	15.9%

Percentage of Wastewater Reused Annually



Wastewater Treatment Plant Operations and Maintenance Compliance

Explanation: A severe staffing shortage (50% vacancy) resulted in less operation and maintenance (O&M) inspections completed in FY 2008. Of the number of plants inspected, only 56% were in compliance. Major O&M deficiencies, effluent violations, or permit violations warrant an unacceptable rating. In FY 2007 and FY 2008, wastewater treatment plants were found to be in non-compliance because they failed to apply for a Wastewater Management permit issued by the Department of Health. Unlike in past years, recent changes in DOH regulation now require all wastewater treatment plants to have a permit to operate. This resulted in low compliance rates in the past two years.

Implications: The goal of the WWB to achieve 90% compliance by the year 2010 is not being achieved because of O&M deficiencies, effluent violations, and the lack of permits. The WWB believes operation and maintenance compliance leads to fewer sewage spills and a safer environment. Well operated and maintained plants and equipment break down less often. Operators were found to be unaware of the new permit requirements for testing and report submittals to the DOH, and are being educated by Department inspectors in the field. Another cause of the unacceptable ratings has been expired underground injections permits which are covered by the O&M inspection. (See page 16 for a discussion of the underground injection permit program).

Data Quality:

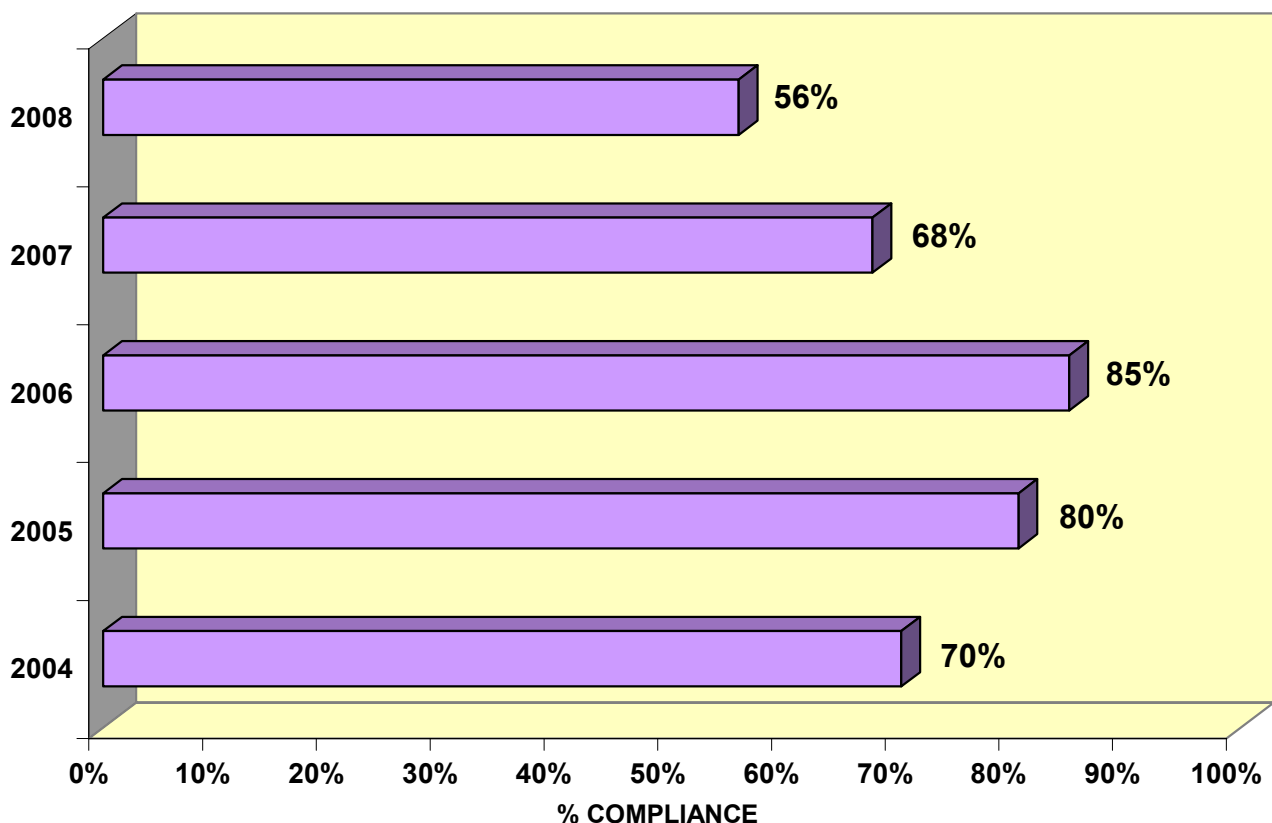
High ($\pm 5-10\%$ confidence).

Source: Marshall Lum (WWB).

Data are not required by the EPA

State FY	Number of Plants Inspected	Number of Plants Rated Unsatisfactory	Percent in Compliance
2004	57	17	70%
2005	41	8	80%
2006	93	14	85%
2007	102	33	68%
2008	34	15	56%

Wastewater Treatment Plant Operation & Maintenance Compliance



Number of Impaired Streams Listed, 2006

Explanation: This stream quality indicator is based on the “2006 State of Hawaii Water Quality Monitoring and Assessment Report: Integrated Report to the US Environmental Protection Agency and the US Congress Pursuant to Sections §303(d) and §305(b), Clean Water Act (P.L. 97-117).” The report identifies waters where our analysis of readily available data indicated non-attainment of State water quality standards, based on the decision making criteria explained in the listing document (please see www.hawaii.gov/health/environmental/envplanning/wqm/). The 2006 report includes 17 new streams that were not listed in 2004. Several changes occurred within the listings including one delisting and a further refinement of tributaries and estuary systems. Total Maximum Daily Loads (TMDLs) of pollutants must eventually be developed for all waterbodies on the List of Impaired Waters. Currently, TMDLs have been established for four Oahu waterbodies (the Ala Wai Canal, Waimanalo Stream, Kapa’a and Kawa Stream), and are near completion for streams draining into Nawiliwili Bay and Hanalei (Kauai), Waiakea and Alenaio Streams (Hawaii) and Pearl Harbor (Oahu), as well as for Kaneohe (Oahu). New TMDL development projects are underway in Ka’elepulu (Oahu) and Kaukonahua (Oahu).

Implications: This stream quality indicator refers only to the inland part of a watershed with freshwater flows that have salinity lower than 0.5 parts per thousand (ppt), including all stream tributaries. The identification of these streams initiates a process that identifies pollutant sources so that agencies, nonprofits, businesses, and community groups can begin to control these sources of pollution, improve water quality, and protect and enhance aquatic ecosystem health.

Data Quality:

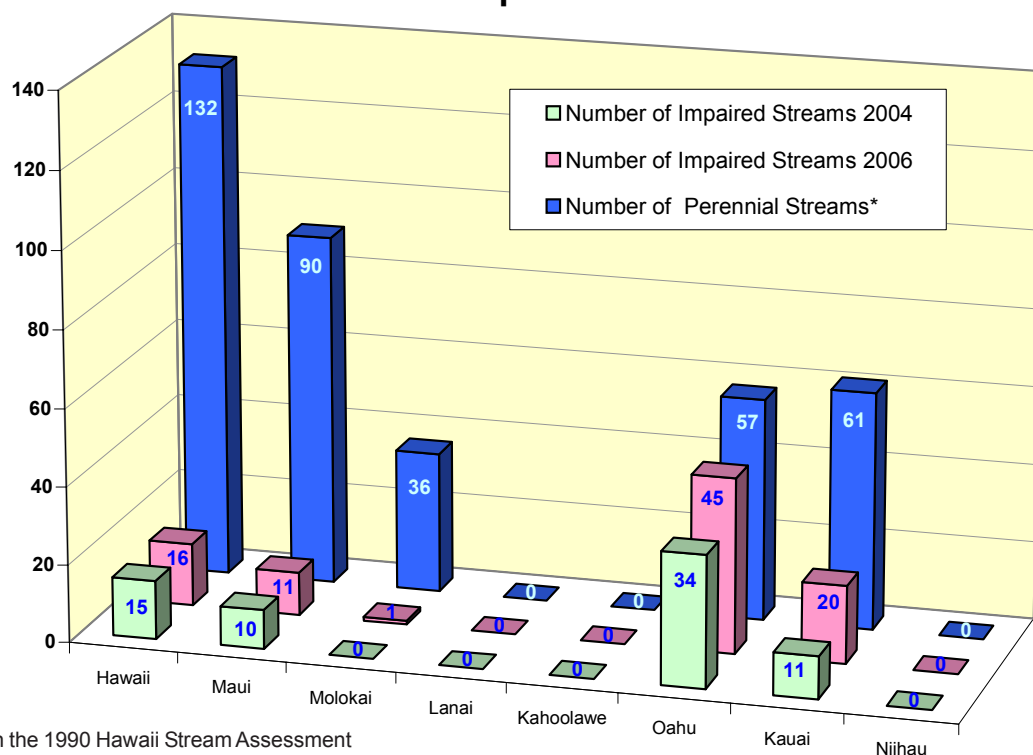
Medium/High (70-80%) confidence.

Source: Linda Koch (EPO)

Data are required by EPA.

Number of Impaired Streams Listed			
Island	Number of Impaired Streams 2006	Number of Impaired Streams 2004	Number of Perennial Streams*
Hawaii	16	15	132
Maui	11	10	90
Molokai	1	0	36
Lanai	0	0	0
Kahoolawe	0	0	0
Oahu	45	34	57
Kauai	20	11	61
Niihau	0	0	0
TOTAL	93	70	376

Number of Impaired Streams Listed



*As identified in the 1990 Hawaii Stream Assessment (Commission on Water Resource Management and National Park Service)

Number of Impaired Coastal Waters Listed, 2006

Explanation: This coastal waters indicator is based on the “2006 State of Hawaii Water Quality Monitoring and Assessment Report: Integrated Report to the US Environmental Protection Agency and the US Congress Pursuant to Sections §303(d) and §305(b), Clean Water Act (P.L. 97-117).” The report identifies waters where our analysis of readily available data indicated non-attainment of State water quality standards, based on the decision making criteria explained in the listing document (please see www.hawaii.gov/health/environmental/envplanning/wqm/wqm.htm).

HIDOH's 2006 303(d) List contains a total of 209 marine areas. The breakdown for the individual islands (number of listed waters per island/total number of listed waters) are: Kauai 26 (13% of total), Oahu 71 (34% of total), Molokai 3 (1% of total), Lanai 6 (3% of total), Maui 72 (34% of total), and Hawaii 31 (15% of total). Marine decision units (boundaries for water areas for analyses) were changed from the 2004 303(d)/305(b) List to the 2006 List, making direct comparison impractical. The boundaries will continue to be refined in the future. In general, 10 acceptable quality samples were required to change the status of a decision unit (water area) from its 2004 evaluation.

Implications: Turbidity was the most common pollutant to marine water listings with 154 occurrences. The HIDOH believes these are due to polluted runoff, and is focusing its polluted runoff control program on selected watersheds to make measurable improvements.

Data Quality:

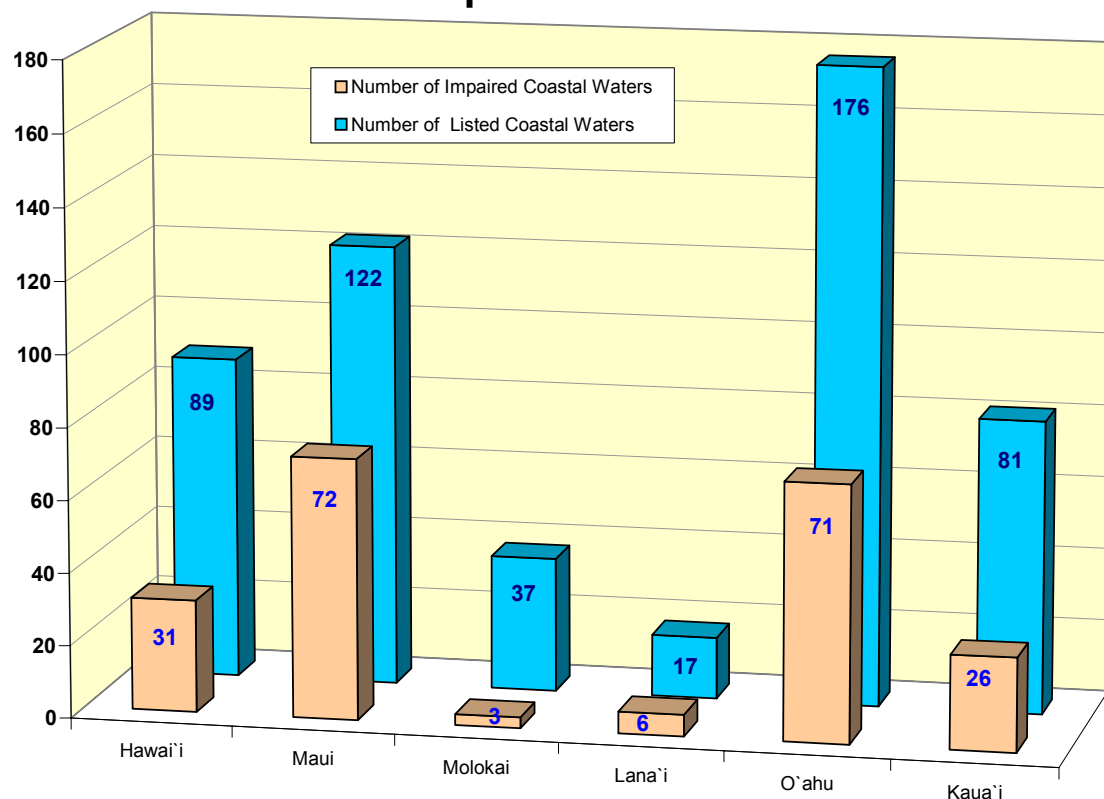
Medium/High (70-80%) confidence.

Source: CWB

Data are required by EPA.

Island	Number of Impaired Coastal Waters	Number of Coastal Waters
Hawai'i	31	89
Maui	72	122
Molokai	3	37
Lana'i	6	17
O'ahu	71	176
Kaua'i	26	81
TOTAL	209	522

Number of Impaired Coastal Waters Listed



Oil and Chemical Releases to Land and Water

Explanation: Any releases of oil or chemicals must be reported to DOH. No clear trend exists in the number of oil and chemical releases from 2004 to 2008. The database currently contains only initial information regarding a release. Follow-up information on releases (including volumes of releases) is not included.

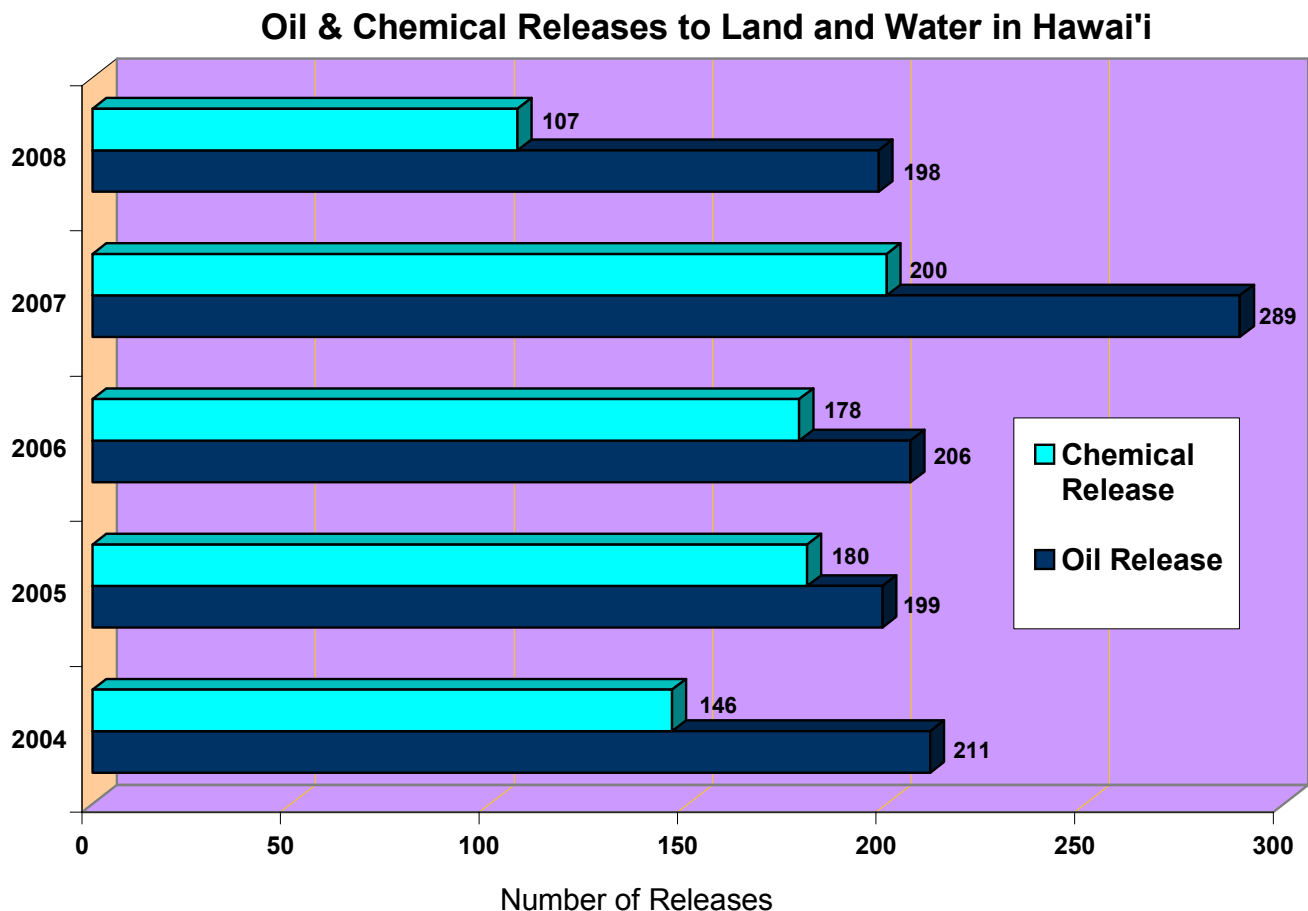
Implications: Hazard Evaluation and Emergency Response (HEER) office crews respond to roughly 400-500 'spills' each year. Most are minor, a few are major, and some are false alarms. An increase in the number of releases does not necessarily correlate with an increase in damage to the environment.

Data Quality: Medium (± 10 -25%) confidence.

Source: Marsha Mealey (HEER).

Data are not required by the EPA.

Oil & Chemical Release Data		
FFY	Oil Releases	Chemical Releases
2004	211	146
2005	199	180
2006	206	178
2007	289	200
2008	198	107



Toxics Release Inventory, Hawaii Report 2006

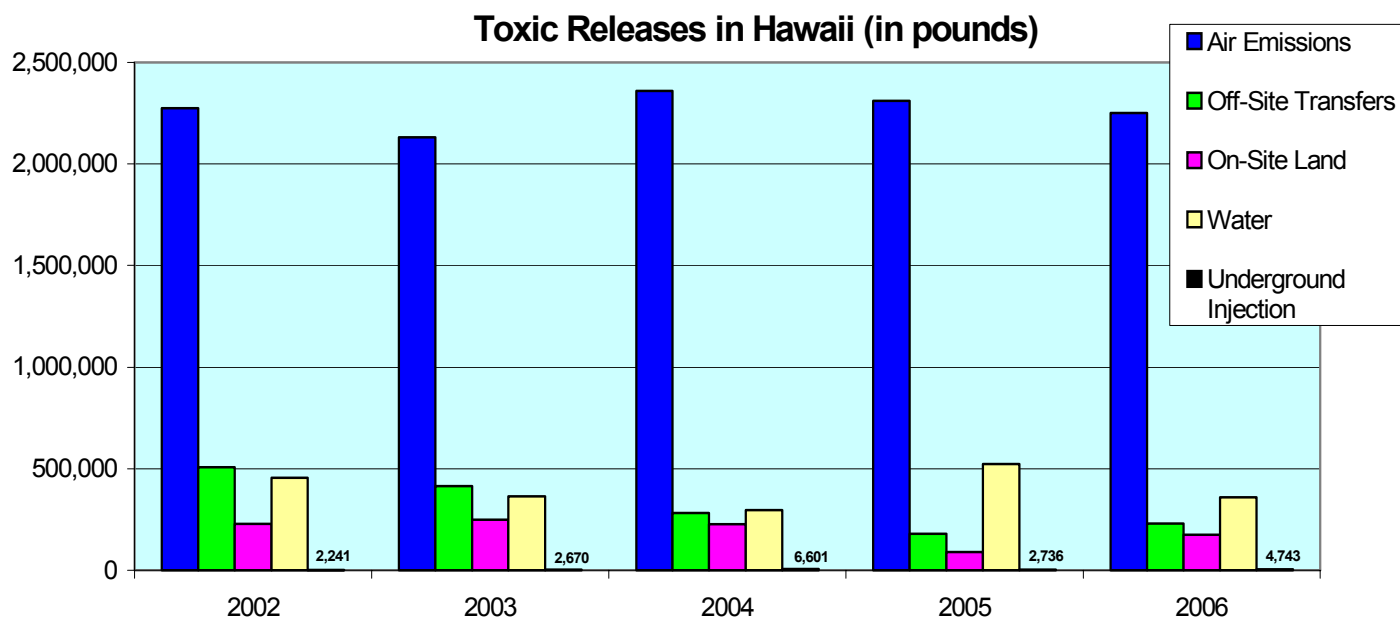
EPA has made public the 2006 data on toxic chemicals that were released to Hawaii's air, water and land. This information comes from the Toxics Release Inventory (TRI), a federal community right-to-know program. In Hawaii, 38 facilities reported a total of 3.1 million pounds of toxic chemical releases.

Hawaii's total reported on-site and off-site releases had a 2.8% decrease (87,000 pounds) when compared to the 2005 data. There was a 31% decrease in reported releases to water, mostly from the U.S. Navy Pearl Harbor Naval Complex, which decreased its water releases by 44%. The largest water releases came from federal facilities. On-site land releases increased by 95%. U.S. Army Schofield /Wheeler Army Airfield was mainly responsible with a 120% increase to land releases. There was a 28% increase in reported transfers off-site for disposal and other waste management. This increase was primarily due to AES Hawaii, Inc., reporting 55,000 pounds more in 2006. Releases to air decreased by 3%. This decrease was largely due to the Tesoro Hawaii Refinery reporting 35,000 fewer pounds for air releases. The electric services industry also reported a large decrease of air releases.

For more detailed information, including information about Persistent, Bioaccumulative, and Toxic (PBT) chemicals, refer to the EPA website at: www.epa.gov/region09/toxic/tri.

**Release is defined as the amount of a toxic chemical released on-site (to air, water, underground injection, landfills and other land disposal), and the amount transferred off-site for disposal. It is important to note that "release" should not be directly equated with "risk." To evaluate risk, release data must be combined with information about chemical toxicity, site-specific conditions, and exposure.*

Toxic Releases in Hawaii (in pounds)					
FFY	Air Emissions	Off-Site Transfers	On-Site Land	Water	Underground Injection
2002	2,274,706	507,425	228,634	454,684	2,241
2003	2,131,959	415,095	249,267	364,067	2,670
2004	2,358,741	281,261	227,719	296,415	6,601
2005	2,311,635	179,869	89,734	522,217	2,736
2006	2,250,944	230,675	174,678	358,236	4,743



Data are not required of DOH by EPA, but EPA does require data from private industries.



For More Information:

State of Hawaii, Department of Health
Environmental Health Administration

www.hawaii.gov/health/environmental

Deputy Director for Environmental Health **586-4424**

Environmental Health Administration Offices:

Compliance Assistance 586-4528

Environmental Planning 586-4337

Environmental Resources 586-4575

Hazard Evaluation & Emergency Response 586-4249

Environmental Management Division **586-4304**

Clean Air Branch 586-4200

Clean Water Branch 586-4309

Safe Drinking Water Branch 586-4258

Solid & Hazardous Waste Branch 586-4226

Wastewater Branch 586-4294

Environmental Health Services Division **586-4576**

Food & Drug Branch 586-4725

Indoor and Radiological Health Branch 586-4700

Sanitation Branch 586-8000

Vector Control Branch 483-2535

State Laboratories Division **453-6652**